

09/21/99
jc586 U.S. PTO

Attorney's Docket No. 929-2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Assistant Commissioner for Patents

Box Patent Application

Washington, D.C. 20231

PATENT

jc584 U.S. PTO
09/21/99
09/401167

UTILITY PATENT APPLICATION TRANSMITTAL

Sir:

Transmitted herewith for filing is the patent application of:

First Named Applicant (or Applicants): **Lee Yung Ku**

Title of Application: **ELECTRONIC FEVER THERMOMETER**

1. Type of Application (37 C.F.R. 1.53(b))

This application is a(n):

☒ Original (nonprovisional) application.

☐ Continuing application:

☐ Divisional

☐ Continuation

☐ Continuation-in-Part (CIP)

of Serial No. 08/, filed on _____.

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed herein are being deposited with the United States Postal Service on this date, September 21, 1999, in an envelope as "Express Mail to Addressee" Mailing Label Number EL457629545US, addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

M. Flaherty
Name of person mailing paper

M. Flaherty
Signature of person mailing paper

2. **Enclosed Papers Required to Obtain Application Filing Date under 37 CFR 1.53(b)**

7 Pages of specification
2 Pages of claims
1 Pages of abstract
1 Sheets of drawings ☐ Formal ☒ Informal

3. **Oath or Declaration**

- ☒ Newly executed Oath or Declaration (original or copy) is enclosed.
- ☐ Copy of Oath or Declaration from prior application 0 / _____ (37 C.F.R. 1.63(d)).
- ☐ The entire disclosure of the prior application, from which a copy of the oath or Declaration is supplied, is considered as being a part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
- ☒ With Power of Attorney ☐ Without Power of Attorney

4. **Additional Papers Enclosed**

- ☒ Return Receipt Postcard (specifically itemized) (M.P.E.P. § 503).
- ☐ Preliminary Amendment.
- ☐ Information Disclosure Statement (37 CFR 1.98).
- ☐ Form PTO-1449 ☐ Copies of IDS Citations
- ☐ Nucleotide and/or Amino Acid Sequence Listing computer-readable copy, paper copy, and statement verifying identity of computer-readable and paper copies.
- ☒ Certified Copy of Priority Document(s).
- ☐ Verified translation of non-English language application (37 C.F.R. 1.52(d)).
- ☒ Other: **Certified English Translation of German Priority Document and Certification**

5. **Assignment**

- ☒ Newly Executed assignment with Recordation Cover Sheet (Form PTO-1595).
- ☐ Copy of Assignment from prior application No. 08 / _____.

6. Fee Calculation (37 CFR 1.16)

Regular Application (37 CFR 1.16(a)) Basic Fee \$760.00

FEES FOR CLAIMS AS FILED									
Number filed		Number extra				Rate			
Total Claims									
(37 CFR 1.16(c))	10	-	20	=	0	×	\$ 18.00	=	\$ 0.00
Independent Claims									
(37 CFR 1.16(b))	1	-	3	=	1	×	\$ 78.00	=	\$ 0.00
Multiple Dependent Claims									
(37 CFR 1.16(d))						+	\$260.00	=	\$

Fee Calculation for Extra Claims \$ 0.00

☐ Amendment canceling extra claims enclosed.

☐ Amendment deleting multiple-dependencies enclosed.

Total Filing Fee Calculation \$ 760.00

7. Small Entity Statement

☐ Verified Statement that this is a filing by a small entity under 37 CFR 1.9 and 1.27:

☐ is enclosed. ☐ will follow.

☐ Status as a small entity was claimed in prior application 08/____, from which benefit is being claimed for this application under:

☐ 35 U.S.C. 119(e),

☐ 35 U.S.C. 120,

☐ 35 U.S.C. 121,

☐ 35 U.S.C. 365(c),

and which status as a small entity is still proper and desired.

☐ A copy of the verified statement in the prior application is enclosed.

Filing Fee Calculation (50% of Filing Fee calculated in Item 6 above) \$ _____

8. Fee Payment

☐ Not enclosed. No filing fee is to be paid at this time.

☒ Enclosed:

☒ Basic filing fee (Item 6 or 7 above) \$ 760.00

☒ Fee for recording Assignment
(\$40.00 (37 CFR 1.21(h))) \$ 40.00

☐ Processing and retention fee
(\$130.00 (37 CFR 1.53(d) and 1.21(l))) \$ _____

Total fees enclosed \$ 800.00

9. Method of Payment of Fees

☒ Check in the amount of \$ 800.00.

☐ Charge Deposit Account No. 08-2461 in the amount of \$ _____.
A duplicate of this transmittal is enclosed.

10. Authorization to Charge Additional Fees

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Deposit Account No. 08-2461:

☒ 37 CFR 1.16(a), (f), or (g) (filing fees)

☒ 37 CFR 1.16(b), (c), and (d) (presentation of extra claims)

☐ 37 CFR 1.16(e) (surcharge for filing the basic fee and/or declaration at a date later than the filing date of the application)

☒ 37 CFR 1.17 (application processing fees)

A duplicate of this transmittal is enclosed.

11. Instructions as to Overpayment

☒ Credit Deposit Account 08-2461.

☐ Refund.

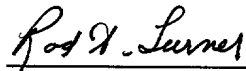
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ELECTRONIC FEVER THERMOMETER

CROSS-REFERENCE TO RELATED APPLICATION

5 This application claims the benefit and priority of German Application No. 298 20 206.9, entitled ELEKTRONISCHES FIEBERTHERMOMETER, filed on November 11, 1998, and issued on February 25, 1999, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

10 This invention relates generally to electronic fever thermometers.

Description of the Prior Art

15 Fever thermometers are used to measure the temperature of the human body. Ordinary mercury thermometers in which the temperature is determined by expansion of mercury, as well as electronic thermometers, are known. The temperature is converted to an electrical signal in an electronic thermometer by an electronic component. Heat-dependent electrical resistors are generally used.

Such fever thermometers must meet various requirements primarily when used in the clinical field.

20 Since thermometers are often destroyed or stolen, the lowest possible manufacturing costs must be considered. Such thermometers must also have a surface that is easy to disinfect and one that exhibits the least possible vulnerability to breakage, as well as guarantee good watertightness and reliable function.

Ordinary mercury thermometers in which the mercury column is integrated in a glass enclosure have satisfactorily met these requirements thus far. However, a problem in mercury thermometers is the toxicity of mercury. Old mercury thermometers are in large part responsible for the amounts of mercury deposited in the environment (for example, at landfills).

Thermometers with gallium solutions are also known. However, such thermometers are relatively expensive and are not unobjectionable in terms of toxicity. The temperature display must also be reset by shaking, which requires considerable expenditure of force in the light gallium solutions.

Ordinary electronic fever thermometers are beset with the drawback that breaks in the surface exist between the housing and the opening inserted in it for the viewing temperature reading, which poses problems with respect to sealing and disinfectability.

An electronic fever thermometer is known from DE 42 13 034, which has a hermetically sealed, air-permeable, windowless bulb in which a solar cell is provided as the power supply. A shortcoming of this thermometer is that the manufacturing and material costs are too high. Moreover, the electronic components are visible, which imparts an unattractive appearance to the thermometer.

An electronic fever thermometer is also known from WO 92/16821, which has a hermetically sealed glass housing. The visibility of the electronic components, as well as the vulnerability to breakage, are also a drawback of this known thermometer.

OBJECTS AND SUMMARY OF THE INVENTION

The task of the present invention is to avoid the drawbacks of the known solutions, especially to devise a fever thermometer that can be simply and economically produced, which guarantees optimal watertightness and is simple to

clean and disinfect. The fever thermometer should also be reliable during long-term use.

The electronic fever thermometer according to the present invention consists essentially of a housing made of a transparent material, preferably a transparent plastic. Plastic is preferred with respect to the manufacturing method and with respect to fracture resistance.

Transparent or opaque is defined as objects that are visible or not visible, respectively, through the material. A translucent, milky surface is nontransparent according to this definition, since light only shines through diffusely. The housing is provided with a temperature sensor to measure the temperature and a display element to display the measured temperature.

The housing according to the invention has an outer and/or inner surface, which is machined, preferably structured, so that the housing is essentially nontransparent to visible light. The housing is not machined in at least one viewing area and is therefore transparent. The display element is arranged in the interior of the housing adjacent to the viewing area. Owing to the treated outer and/or inner surface the housing is essentially nontransparent so that the components in the interior of the thermometer are not apparent. Only in the region of the display element is the housing transparent. An essentially nontransparent housing can therefore be produced in one piece without having to use a viewing window separately in the area of the display element, as in known fever thermometers. On the one hand, this permits more economical manufacture. On the other hand, owing to the smooth surface without joints, disinfection of the fever thermometer is simpler and guarantees watertightness. In addition, costly coating (not resistant during use) of the surface with paint or another coating is avoided.

The viewing area and display element are designed essentially congruent, i.e., they have roughly the same shape and area.

The housing can be made in one piece from transparent plastic material. The housing is preferably produced from polycarbonate (PC) in an injection molding process.

The housing is also preferably provided with a metal tip that can be glued into the housing. The temperature sensor in this case is arranged within this metal tip. The metal tip permits rapid heat transfer between the tissue whose temperature is to be measured and the temperature sensor.

The display element preferably consists of an LCD display. Energy consumption can thus be kept relatively low. However, other means of display, for example, LED displays or non-numerical displays, are conceivable.

Both the outer surface of the housing and the inner surface of the housing or the outside and inside surface of the housing can be machined according to the invention. Treatment can occur during the manufacturing process in the injection molding process in a die, whose surfaces are mechanically and/or chemically treated. In particular, the surfaces of the die can be roughened by grinding, treatment with a blasting abrasive or etching. However, it is also possible to subsequently treat the surfaces of the housing or to apply a coating, for example, paint.

A roughened inner surface has the advantage that the outer surface can be left smooth. A smooth surface is more pleasant for the user.

The electronic fever thermometer is provided with a battery. A long-term battery is preferably used, which is advantageously welded unreplaceably into the housing. The watertightness is thus increased and the reliability of the fever thermometer improved. The fever thermometer is thus designed as a disposable thermometer. The battery is preferably welded into the housing. This design also has a positive effect in terms of manufacturing costs. The battery cover, moving contacts and the like can be dispensed with.

5 The electronic fever thermometer is also preferably provided with a switch. The switch can be inserted in an opening of the housing and sealed. A flexible membrane or O-ring seal, for example, can be used for sealing, beneath which a contact element is arranged. Other variants, for example, with contactless switches, are also conceivable.

These and other objects, features and advantages of the present invention will be apparent from the following detailed description of illustrative embodiments thereof, which is to be read in connection with accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

10 Figure 1 shows an electronic fever thermometer according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15 The electronic fever thermometer 10 consists essentially of a housing 11. The housing tapers on one side to a tip 23. A metal housing 26 is arranged on tip 23, preferably glued into the housing. A temperature sensor 12 for measurement of the temperature is provided in the interior of metal housing 26. The metal tip facilitates heat transport between the tissue whose temperature is to be measured and the temperature sensor 12.

20 The housing 11 is also provided with a switch 25. The switch 25 is inserted in an opening on housing 11. The housing can consist of a main part 14 and a battery cover 15. The battery cover 15 is preferably welded tight to the main part 14 so that watertightness is guaranteed.

25 A battery (not shown) is inserted into housing 11. The main part 14 and the battery cover 15 are then permanently welded to each other. Before welding, the other electronic components essential for operation are also inserted into housing 11. In particular, these are the temperature sensor 12, electrical connections (not shown)

that connect the temperature sensor 12 to a control circuit (also not shown), as well as a display element 13 to display the measured temperature. These individual components are known to one skilled in the art and need not be described in detail.

5 The housing 11 has an outside surface 20 and an inside surface 21. At least one of these two surfaces is structured so that the housing, which consists of a transparent plastic material, is essentially nontransparent. The battery cover is also preferably treated on the inside surface 24 and/or outside surface 23 so that it is not transparent.

10 The display element 13 is designed as an LCD display. The LCD display is arranged beneath a viewing area 22 on housing 11. The viewing area 22 defines a section in housing 11 that is transparent to visible light. It is therefore guaranteed in simple fashion that the housing 11 is essentially nontransparent, but is transparent in the region of display element 13, where this is required.

15 The manufacturing method for the fever thermometer according to the invention is configured as simply as possible when the main part 14 of housing 11 and the battery cover 15 are produced in the first step in one piece from plastic material, in which the surface of the injection molding die is treated so that at least one of the surfaces of the part is structured. The structure in the outside and/or inside surface means that light is scattered diffusely and the housing becomes nontransparent.

20 To simplify the method the main part 14 and battery cover 15 are treated over the entire surface so that initially no transparent regions are present. The viewing area 22 can then be produced by polishing. However, it is also conceivable to spare one part of the surface of the die of housing 11 from treatment, for example, by covering.

25 Treatment of the die surfaces can occur mechanically or chemically. In the preferred practical example, the structured surface is produced by etching of the injection molding die surface.

The individual components of the fever thermometer are then attached to main part 14. The temperature sensor 12 and metal tip 26 are glued into the tapering tip 23 and the display element 13 is inserted with the necessary wiring and control electronics. A battery (not shown) with corresponding contacts is then connected and inserted. Finally, the housing 11 is hermetically sealed by welding on battery cover 15. Roughening of the surfaces of housing 11 can occur before or after closure of housing 11. Welding of the two parts preferably occurs by ultrasonic welding. It would also be conceivable to subject the individual parts after injection molding to a separate working step for surface treatment.

Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawing, it is to be understood that the invention is not limited to those precise embodiments, and that various other changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention.

WHAT IS CLAIMED IS:

1. An electronic fever thermometer including a housing made from a transparent material, the electronic fever thermometer comprising:

a temperature sensor and a display element to display the temperature measured by the temperature sensor, the housing having at least one of an outer surface and an inner surface treated such that it is coated, the housing being substantially nontransparent and having at least one untreated and substantially transparent viewing area in which the display element is arranged adjacent to the viewing area.

2. An electronic fever thermometer according to Claim 1, wherein the viewing area and the display element are substantially congruent.

3. An electronic fever thermometer according to Claim 1, wherein the housing includes a main part and a cover part which are produced in one piece from transparent plastic material.

4. An electronic fever thermometer according to Claim 1, wherein the housing includes a metal tip, the metal tip being disposed in the housing, the temperature sensor being positioned in the metal tip.

5. An electronic fever thermometer according to Claim 1, wherein the display element includes an LCD display.

6. An electronic fever thermometer according to Claim 1, wherein at least one of the outer surface and inner surface is produced in an injection molding die, a surface of the injection molding die being roughened by at least one of a mechanical and chemical treatment by exposure to at least one of a blasting abrasive, etching and grinding.

7. An electronic fever thermometer according to Claim 1, wherein the thermometer includes a battery that is permanently affixed within the housing.

8. An electronic fever thermometer according to Claim 1, wherein the housing includes a switch.

9. An electronic fever thermometer according to Claim 1, wherein the housing is sealed by ultrasonic welding.

10. An electronic fever thermometer according to Claim 3, wherein the main part and the cover part are made from polycarbonate by injection molding.

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ABSTRACT

An electronic fever thermometer includes a housing made of a transparent material, for example, transparent plastic. The housing includes a temperature sensor to measure the temperature, and a display element to display the measured temperature. The housing has a treated outer and/or inner surface so that the housing is essentially nontransparent to visible light. The housing also has an untreated viewing area. The display element is arranged within the housing adjacent to the viewing area.

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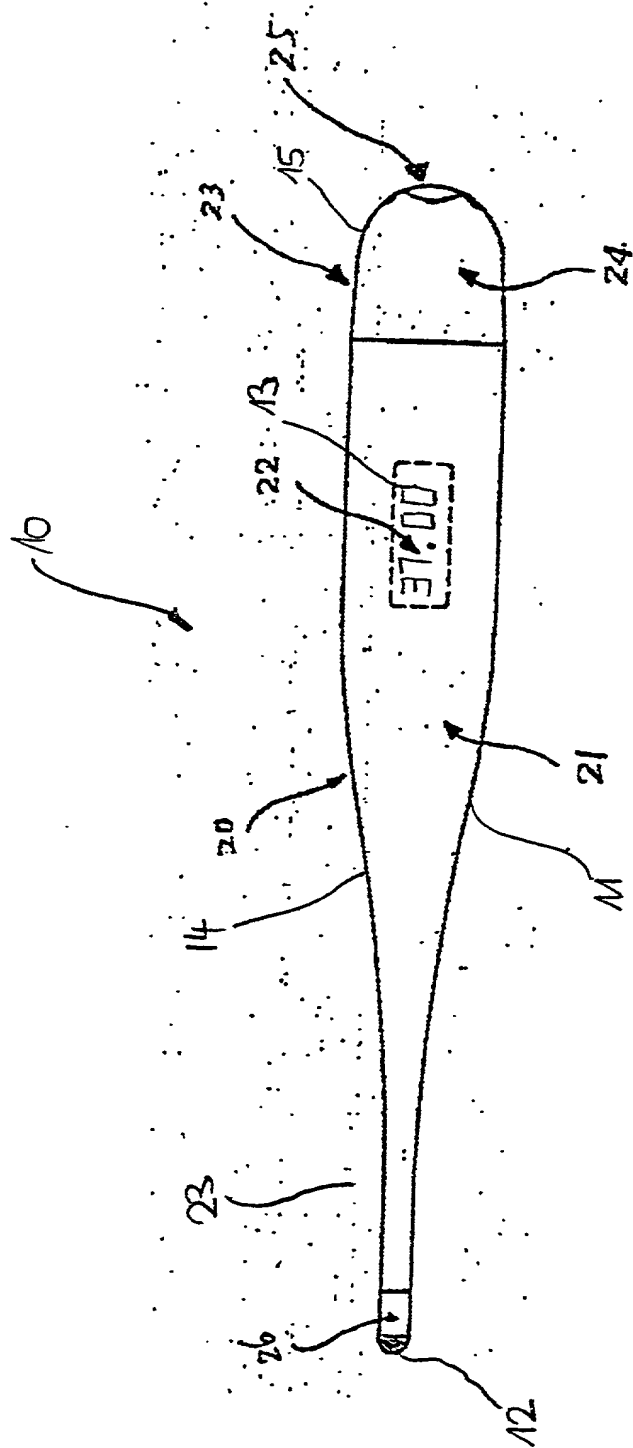


Fig. 1

Attorney's Docket No. 929-2**COMBINED DECLARATION AND POWER OF ATTORNEY**(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL,
DIVISIONAL, CONTINUATION OR CIP)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATIONThis declaration is of the following type: *(check one)*☒ Original
☐ Supplemental
☐ Design☐ National Stage PCT
☐ Divisional
☐ Continuation
☐ Continuation-in-Part (CIP)**INVENTORSHIP IDENTIFICATION****NOTE:** *If the inventors are each not the inventors of all the claims an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.*

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

ELECTRONIC FEVER THERMOMETERthe specification of which: *(complete (a), (b) or (c))*(a) ☒ is attached hereto.(b) ☐ was filed on _____ as☐ Serial No. 08/ _____ or☐ Express Mail No. _____, as Serial No. not yet known
and was amended on _____. *(If applicable)*(c) ☐ was described and claimed in PCT International Application No. **PCT/** _____
filed on _____ and as amended under PCT Article 19 on _____. *(If any)*

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above, and that the filing of said specification, if heretofore filed, was authorized by me.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

CLAIM OF PRIORITY OF EARLIER FOREIGN APPLICATION(S) UNDER 35 U.S.C. §119(a)-(d)

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

(List prior foreign/PCT application(s) filed within 12 months (6 months for design) prior to this U.S. application.)

NOTE: Where item (c) is entered above and the International Application which designated the U.S. claimed priority check item (e), enter the details below and make the priority claim.

COUNTRY (or PCT)	APPLICATION NO.	DATE OF FILING (Day/Month/Year)	PRIORITY CLAIMED UNDER 35 USC §119
Germany	298 20 206.9	November 11, 1998	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S) UNDER 35 U.S.C. §119(e)

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below:

(List prior U.S. provisional applications.)

PROVISIONAL APPLICATION NO.	FILING DATE (Day/Month/Year)

CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S) UNDER 35 U.S.C. 120

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

(List prior U.S. applications or PCT international applications designating the U.S. for benefit under 35 U.S.C. §120.)

U.S. APPLICATIONS**STATUS** (Check One)

U.S. SERIAL NO.	U.S. FILING DATE (Day/Month/Year)	Patented	Pending	Abandoned
0 /		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0 /		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PCT APPLICATIONS DESIGNATING THE U.S.**STATUS** (Check One)

PCT APPLN. NO.	PCT FILING DATE (Day/Month/Year)	U.S. SERIAL NOS. ASSIGNED (If any)	Patented	Pending	Abandoned
PCT/			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCT/			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

35 USC 119 PRIORITY CLAIM, IF ANY, FOR ABOVE LISTED U.S./PCT APPLICATIONS

PRIORITY APPLICATION NO.	PRIORITY COUNTRY	FILING DATE (Day/Month/Year)	ISSUE DATE (Day/Month/Year)

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office in connection therewith:

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DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

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Country of Citizenship: **Republic of China**

Residence Address: **104-3, Hsueh Fu Road, Tan Shui Chen, Taipei Hsien, Taiwan, R.O.C.**

Post Office Address: **Same as Above**

Date:

Sep. 7 '99

Inventor's signature

Y. K. Lee

NOTE: All above spaces identifying inventors must be completed or deleted before any inventor executes this application